

correctly as *Palaquium stellatum* (l.c. VIII, p. 402); but he did not know that this was from the type collection cited by Ridley for *Bassia Watsoni*. Lam, therefore, still retained the name *Madhuca Watsoni* in this later publication with a note that he has not seen any specimen of the species. (l.c. VIII, p. 462).

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SPECIES OF NEESIA IN THE MALAY PENINSULA.

The primary object of this note is to restore to its proper rank, the species *Neesia synandra*, Masters, the specific status of which has long been in doubt, and also to show the limits of distribution of all the three species found in the Malay Peninsula. That Masters had made a careful examination of the type specimen of his species is quite clear from the generic characters given by him under *Neesia* in Hook f. Flor. Brit. Ind. I pt. 2 (1874) 352, which, as far as the leaves and flowers were concerned, were all a result of his own observations made of the type specimen of his species. But the confusion occurred owing to a mistake he made in giving almost all the important characters of his species under the generic description, where they escaped the attention of the botanists who tried to study his species, giving the minor ones under the description of his species. It was probably his intention to show the characters of the genus *Neesia* as he had found it in the Malay Peninsula; for he was fully aware that his generic description was not applicable, at least in the characters of the filaments, to *Neesia altissima*, Bl., the only other *Neesia* species known then; in fact he himself draws attention to this fact under the description of his species. The result of the transference, which Masters unwittingly made, of the important specific characters to the generic description was that *Neesia synandra*, Mast., was either regarded as a doubtful species, or confused with others quite distinct. Hence a detailed description of *Neesia synandra*, Mast., and a sufficient synonymy of all the three species occurring in the peninsula together with an artificial key are given below so as to make their distinctions and their specific ranks quite clear.

KEY.

1a. Leaves up to 24 x 12 cm., glabrous, with 12–15 pairs of nerves. Flowers in the axils of fallen leaves. Peduncle 0.2 cm. thick, pedicels 1–2 cm. long. Calyx globose in the bud abruptly contracted towards the apex, later somewhat compressed with margins inflexed inwards, not involute *Neesia malayana*.

1b. Leaves over 30 x 15 cm. glabrous to distinctly hairy beneath, with 18–26 pairs of nerves. Flowers axillary, or in the axils of fallen leaves. Peduncle 0.3–0.4 cm. thick;

pedicels up to 1 cm. long. Calyx globose in the bud contracted or not towards the apex, later saucers shaped with margins involute or not.....(2)

2a. Leaves up to 45 x 17 cm. glabrous or subglabrous. Branchlets and petioles hairy or glabrous, rarely covered with a few scales. Stipules glabrous, subglabrous or rarely with a few scales. Flowers axillary or in the axils of fallen leaves. Calyx globose in the bud abruptly contracted towards the apex, later saucers shaped with involute margin, wholly or partly pubescent within.....*N. altissima*.

2b. Leaves over 45 x 20 cm. distinctly hairy beneath. Branchlets and petioles scaly, not hairy. Stipules thickly covered with scales outside, tomentose within. Flowers in the axils of fallen leaves. Calyx globose in the bud with cuneate apex, later convexly saucers shaped with margin spreading, not involute, glabrous within.....*Neesia synandra*.

Neesia synandra, Masters in Hook. f. Flor. Brit. Ind. I pt. 2(1874) 352; Mast. in Journ. Linn. Soc. Bot. XIV(1875) 504; Becc. Malesia III (1889) 263; King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2(1891) 56, reference to Maingayi's specimen only; Ridl. Flor. Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. 1(1922) 265 pro parte; Merr. in Journ. Roy. As. Soc. Str. Br. LXXXVI(1922) 328?

Arbor c. 20 m alta, 60-70 cm. diametro. Ramuli crassi, tereti, inferne delapsu foliorum conspicue cicatrisati, glabri, superne foliosi, lepidoti. Folia alterna, petiolata; stipulis deciduis, foliaceis, sessilibus, lanceolatis uni vel obsolete multi-nerviatis, 5 cm. longis, extus squamatis, intus tomentosis; petiolo usque 10 cm. longo, 0.7 cm. crasso, lepidoto, terete, basi dilatato trigono, apice inflato; lamina adulta 45-55 cm. vel magis longa, plus 20 cm. lata, coriacea obovato-oblonga, basi attenuata, saepissime cordulata, raro rotundata, apice semper emarginata, margine integra subundulata supra glabra costis nervisque sparse pilosis exceptis, subrugosa, dense punctulata, subtus aspera, pilosa, costis nervisque lepidotis exceptis; juvenilis utrinque dense tomentosa subtus costis nervisque lepidotis exceptis; nervis (lateralibus) 20-24 parallelibus, prope marginem arcuatis, in pagina superiore depressis, inferiore valido-prominentibus. Inflorescentia subterminalis, ad axillas foliorum delapsorum, corymboso-multiflora divaricata, usque 3.5 cm. longa. Pedunculi ad singulum pulvinum 1-3, ramosi, densissime squamati, angulati, basi 0.4 cm. crassi; bracteis minimis (0.3 cm. longis), densissime lepidotis, caducissimis. Pedicelli usque 1 cm. longi, angulati, densissime lepidoti. Involucellus trilobatus, caducus, extus lepidotus, intus glaber. Calyx primum globosus, apicem

versus sensim angustatus, sub anthesi convexo-disciformis margine obsolete crenulato, haud fisso, haud involuto, extus squamis densissime obtectus, intus glaberrimus, circiter 1–1.5 cm. diametro, persistens. Corolla pentapetala, petalis liberis, contortis, in calyptram cohaerentibus, mox deciduis, utrimque obtusis, extus basi glabro excepto timentosis, intus glabris, 1 cm. longis, 0.4 cm. latis. Stamina numerosa (± 20 –30), monadelpha, in 5 acervos obsolete divisa, quam corolla breviora, omnia fertilia; filamentis ad medium connatis; antheris extrorsis, bilocularibus visu. Pistillum stamina superans, 0.7 cm. longum; stylo brevi, tereti, glabro; stigmatibus crasso, capitato secus marginem minute puberulo; ovario subsessili, quinqueloculari, oblongo, ciliato. Fructus pedunculatus; immaturus quinquangularis obovatus basi apiceque obtusus, pyramidato-tuberculatus; submaturus partim virescens partim purpurascens, muricatotesselatus, partimquejugatus, sectione transversa stellatus, 15 cm. longus, ellipticus, apice obtusus, ima basi acutus; maturus ad angulos prominentes ad apicem valvatim dehiscens; valvis 5, lignosis, medio septiferis, basi connatis, superne hiantibus, extus lividis, intus pilis rigidis prurientibus luteis densissime tectis, ad margines axiales plures semines utrimque ferentibus; seminibus ellipsoideis, apice obtusis, basi cuneatis, horizontalibus, nudis, nigris, usque 2 cm. longis, 1 cm. crassis. Indumentum pro magis parte stellulatum. Squamae peltatae.

Tree about 20 metres tall, 60–70 cm. through. Branchlets thick, terete, marked with conspicuous scars of fallen leaves, glabrous, but covered with scales in the terminal leaf-bearing parts. Leaves alternate, petioled; stipules deciduous, foliaceous, sessile, lanceolate, one or obscurely many-nerved, 5 cm. long, scaly outside, tomentose inside; petiole up to 10 cm. long, 0.7 cm. thick, scaly, terete, dilated trigonal at base, inflated at apex; adult leaves 45–55 cm. or more long, more than 20 cm. broad, coriaceous, obovate-oblong, narrowed into a very often cordulate, rarely obtuse, base, always with an emarginate apex, with entire, slightly undulate margin, glabrous above except for a few hairs along the midrib and nerves, and minutely and thickly punctate; in the under surface rough and hairy except for the scaly midrib and very often scaly nerves; nerves (lateral) 20–24 pairs, parallel arched near the margins, sunk above, raised beneath. Corymbs many-flowered, divaricate, subterminal, in the axils of fallen leaves, up to 3.5 cm. long. Peduncles 1–3 on each pulvinus, branched, densely covered with scales, angled, 0.4 cm. thick at base; bracts small (0.3 cm. long), thickly covered with scales, caducous. Pedicels up to 1 cm. long, angled, thickly lepidote. Epicalyx trilobed, caducous, scaly outside, glabrous within. Calyx globose in the bud, with gradually cuneate apex, later dilated and compressed into a convex disc with obscurely crenulate, but

not split nor involute, margin, thickly coated with scales outside, glabrous within, about 1–1.5 cm. in diameter, persistent. Petals 5, contorted, free but cohering together, deciduous, obtuse at base and apex, 1 cm. long, 0.4 cm. wide. Stamens numerous ($\pm$ 20 to 30) monaldehyous, but obscurely arranged in 5 bundles, shorter than the corolla, all fertile, each bundle alternate with the petals, divided half-way into numerous filaments; anthers apparently all bilobed, extrorse. Pistil longer than the stamens, 0.7 cm. long; style short, terete, glabrous; stigma thick, capitate, minutely puberulous along the margins; ovary subsessile, oblong, 5-locular, ciliate with long persistent hairs; ovules numerous 2-seriate, horizontal, anatropous. Fruit peduncled; very young pentagonal, obovate obtuse at base and at apex, covered with pyramidal spines all over; half-ripe fruits partly green and partly purplish faintly suffused with blue, muricate-tesselate, 5-ridged, star-shaped in transverse section, 15 cm. long, elliptic, obtuse at apex, cuneate at the very base; ridges 6 cm. high from the axis of the fruit, the furrows 2.5 cm. deep; mature fruits open along the ridges into 5 valves; valves woody, carrying the septum in the middle, united at the base, opened at apex, blue-black outside, densely covered within with rigid, stinging, yellow hairs; seeds many, borne horizontally on both sides along the axial margins of the valves, ellipsoid, obtuse at apex, cuneate at base, smooth, naked, black, up to 2 cm. long, 1 cm. thick. Hairs on the vegetative parts of the plant mostly stellate; scales always peltate.

PENANG, Sungei Telok Bahang (Burkill, n. 4556, flrs. in Feb. 1919); Telok Bahang, (Forest Guard under Curtis, n. 3081 leaves only); Penara Bukit, (Forest Guard under Fox, flrs. in March 1905).

SELANGOR, Weld Hill in Kuala Lumpur (Hamid no. C.F. n. 2301 leaves only).

SINGAPORE, Bukit Timah, (Ridley, flrs. and very young fruits in Feb. 1890; ripe fruits in Oct. 1904 and Sept. 1908; Holttum & Furtado, n. 19788, flrs. & fruits in all stages in Nov. 1928).

Distribution—Borneo?

I have not seen the Bornean specimen referred to by Merrill, but he says that it agrees in its vegetative characters with Fox's specimen from Penang, which is *N. synandra*, Mast. He describes its fruits (not quite mature) as ellipsoid, 20 x 10 to 12 cm. when dry.

Neesia altissima (Bl) Bl. in Nov. Acad. Cur. XVII (1835) 75 & 83, t. 6; Becc. Malesia III (1889) 261; Bakhuizen in Bull. Jard. Buitz. VI (1924) 221 & 246 (for fuller bibliography and synonymy of this species see this work).

Esenbeckia altissima, Bl. Bijdr. Flor. Ned. Ind. 1 (1825) 119.

Neesia ambigua, Becc. Malesia (1887—1889) 261, t. 31 fig. 1.

Neesia glabra, Becc. 1. c. 263, tt. 30 et 31 figs. 2-4.

N. synandra, Mast. sensu King Mat. Flor. Mal. Pen. in Journ. As. Soc. Beng. LX, pt. 2, (1891) 56, exclusive of reference to Maingay's specimen; Ridley Flor. Mal. Pen. I(1922) 265 pro parte.

PERAK, Sungei Larut (Wray, n. 2271, flrs. in July 1888; n. 2875, small fruits in Aug. 1888); Gopeng (Kunstler, n. 5768, fruits in April 1884); Batu Kurau in Taiping (Haniff, n. 13265, flrs. in May 1924); Tukang Sidin in Teluk Anson (Haniff, n. 14161, young fruits in Sept. 1924); Bagan Serai in Krian, (Mitchell, C.F. n. 5679, flrs. in April and fruits in June of 1922, vern. name Bengang).

• *Distribution*—Lower Siam, Borneo, Java, and Sumatra.

I have taken the name *N. altissima*, Bl., *sens. lat.*, to include the various forms or varieties of this species. Wray n. 2271 has an obscurely 3-5 lobed epicalyx glabrous within except for a thin tomentose ring at base, petals lightly tomentose in the upper half and glabrous in the lower half and along the margins and inside, and glabrous stigma. Haniff's n. 13265 has a deeply trilobed, larger epicalyx tomentose within, petals tomentose outside almost to the base and pilose stigma as in Bakhuizen's specimen n. 5884 cited under *var. typica*, Bakh. l.c. 246. The specimen from Lower Siam (Haniff and Nur, n. 3905, from Khaw Poh Hill, flrs. in Dec. 1918) has its epicalyx like Wray's specimen, but the petals and the stigma as in Haniff's specimen. *Neesia* has not been credited for Lower Siam even in Craib's list of the Siamese plants (Flor. Siam. Enum. 1925, pt. I).

Neesia malayana, Bakh. in Bull. Jard. Bot. Buitz. VI (1924) 221 et 247, tt. 34 et 35.

Neesia synandra, Mast. sensu Ridl. Flora of Sing. in Journ. Roy. As. Soc. Str. Br. XXXIII(1900) 51 pro parte; Ridl. Flor. Mal. Pen. 1(1922) 265, pro parte.

Singapore, Chan Chu Kang (Ridley, n. 3770, flrs. in 1890); Kranji (Mat. n. 5846, flrs. 1894); near Cluny Road in Tanglin (Furtado, flrs. in Feb. 1924).

Distribution—Sumatra.

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